

REMARKS

Claims 1-15 are currently active.

The Examiner has rejected Claims 1-15 as being unpatentable over the German reference in view of Nixdorf and EPO reference. Applicants respectfully traverse this rejection.

General requirement:

A filter uniformly coated with absorbing material is a necessary BUT NOT SUFFICIENT condition to achieve uniform heating. What must also be true is that the heating system must be able to supply energy uniformly to the entire filter.

Example 1: Assume we have a filter that is uniformly coated with a microwave absorbing material, but fitted with a microwave distribution system that provides microwave energy non-uniformly to the filter, complete regeneration of the filter cannot be successfully accomplished because:

1. regeneration will occur preferentially at the heated localized area leaving the rest of the region under or un-regenerated, resulting in poor regeneration efficiency or filter failure; or
2. overheating will occur at the “localized” region if power is increased to raise the temperature of the entire filter above regeneration level, resulting in filter damage.

Specific Differences:

German Patent No. 4014153

1. The German device does not have the NECESSARY microwave absorbing material or coating in the filter for uniform heating. Heating is thus inefficient and at best spotty and localized at places where carbon soot is trapped. Non-uniform heating causes thermal stresses in the filter, resulting in cracking and destruction of the ceramic material that makes up the filter.
2. The German microwave feeding ports are located and point at the filter. This results in localized heating and thus cannot successfully achieve complete regeneration because of non-uniform heating. Applicants’ claimed system feeds microwave into the region between the filter and perforated end-plates to achieve effective uniform heating from

both ends. Feeding from the two ends provide good, uniform heating profile in the filter which is substantiated by experimental measurements.

3. The ends of the microwave cavity in applicants' claimed device are terminated by perforated diaphragms. This approach makes the device more compact.
4. Applicants' claimed system provides tuners (e.g. 3-stub tuners or adjustable iris) to better couple microwave into the cavity.
5. The microwave tubes are protected by different devices. Applicants' claimed invention uses the SiC-coated filter itself, with the options, if necessary, of using isolators or circulators.
6. Applicants' claimed system has provision for acoustic isolation to protect against damage in the microwave tube (filament and other circuit components) by engine of vehicular vibrations.
7. The applicants' claimed system also protects the microwave tubes from the heat, soot and gasses from the exhaust flow. The Germans do not have a means to protect their microwave tubes, thus their tubes burn out.

Nixdorf Patent No. 5,087,272

1. Single port microwave feeding system cannot provide uniform filter heating. Silicon carbide coating is only a NECESSARY condition for microwave absorption, but NOT SUFFICIENT unless the microwave feed system is configured properly.

2. Uniform heating was stated without substantiation in the patent.

EPO Patent No. 327,439

1. A double-ended dual input microwave feed system may be a necessary condition for uniform filter heating, but NOT sufficient unless the filter is made of microwave absorbing material.
2. The microwave input antennas are not protect from the soot, which will coat and short them out and cause failure.

Summary

Each of the cited patents will not provide uniform filter regeneration. None of them satisfied both the necessary conditions. No references or suggestion were made in any of these patents to a system that resembles applicants' claimed system. Since each reference fails to teach or suggest uniform filter regeneration, the combination of the three references also fails to teach the same.

In view of the foregoing amendments and remarks, it is respectfully requested that the outstanding rejections and objections to this application be reconsidered and withdrawn, and Claims 1-15, now in this application be allowed.

CERTIFICATE OF MAILING

I hereby certify that the correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.
on 8/1/03

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